

REMARKS

The Applicants respectfully request reconsideration of this application in view of the above amendments and the following remarks.

Drawing Objections

The Examiner has objected to the drawings.

Applicants respectfully submit that the claims have been amended to overcome the reasons for objection. In particular, the apparently objectionable term "more", as in "one or more annealing chambers", has been removed from each of the independent claims. Additionally, two paragraphs of the specification have been amended. Support for these amendments is found at least at the top of pages 9 and 12, as well as elsewhere in the application. Therefore, Applicants respectfully request that the objection be withdrawn.

Claim Objections

The Examiner has objected to claims 32, 41, 42, 48, and 49. These claims have been cancelled herein. For the Examiner's convenience, Applicants respectfully submit that claims 57, 68, 69, 77, and 78 approximately correspond to claims 32, 41, 42, 48, and 49, respectively.

The Examiner has stated that "with respect to claims 32, 42 and 49, the limitations of these claims have already existed in claims 31, 40, and 47, respectively, thus fails to further limit the claims that they depend on". Applicants respectfully disagree. The independent claims 31, 40, and 47 included the limitation "comprising" whereas the dependent claims 32, 42 and 49 included the limitation "consists essentially of". It is well known in patent law that these two limitations are interpreted differently.

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Accordingly, claims 32, 42, and 49 further limited or defined the subject matter of what is being claimed. Accordingly, the objection is believed to be improper.

The Examiner has stated that "with respect to claims 41 and 48, since the functions of the robot is to move wafers from one chamber to another chamber, therefore by claiming the robot to move wafers from another chamber to one chamber does not further limit the functionality of the robot, thus fails to limit the claims 40, 47, respectively". Applicants respectfully disagree. It is well known that a robot has logic or other means for controlling its operation. Claims 41 and 48 further define the operation of the robot and therefore further define the logic or other means for controlling the operation of the robot. Accordingly, the objection is believed to be improper.

Rejection Under 35 U.S.C. § 112

The Examiner rejects claims 52-54 under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In particular, the Examiner has objected to the negative limitation, has relied upon *In re Schechter*, 205 F.2d 185, 98 USPQ 144 (CCPA 1953).

As stated in MPEP 2173.05(i) entitled "Negative Limitations":

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The current view of the courts is that there is nothing inherently ambiguous or uncertain about a negative limitation. So long as the boundaries of the patent protection sought are set forth definitely, albeit negatively, the claim complies with the requirements of 35 U.S.C. 112, second paragraph. Some older cases were critical of negative limitations because they tended to define the invention in terms of what it was not, rather than pointing out the invention. Thus, the court observed that the limitation "R is an alkenyl radical other than 2-butenyl and 2,4-pentadienyl" was a negative limitation that rendered the claim indefinite because it was an attempt to claim the invention by excluding what the inventors did not invent rather than distinctly and particularly pointing out what they did invent. *In re Schechter*, 205 F.2d 185, 98 USPQ 144 (CCPA 1953).

As indicated in MPEP 2173.05(i), *In re Schechter* is an older case. Applicants respectfully submit that the boundaries of the patent protection sought were set forth definitively by claims 52-54. In any event, the Examiner has given no reason why the boundaries of the patent protection sought were NOT set forth definitively by claims 52-54, and therefore the rejection is believed improper.

Furthermore, the negative limitation has basis in the original disclosure. The first paragraph on page 6 recites"

"A wafer processing apparatus including a metal deposition tool having annealing capability is described. Examples of metal deposition tools are electroplating tools or chemical vapor deposition (CVD) tools. The integration of annealing capability into a metal deposition tool can result in better control over the stabilization of the metal prior to a subsequent process such as chemical mechanical polishing (CMP). Alternatively, (emphasis added) annealing capability can be integrated into the CMP tool."

If alternative elements are positively recited in the specification, they may be explicitly excluded in the claims. See *In re Johnson*, 558 F.2d 1008, 1019, 194 USPQ 187, 196 (CCPA 1977). See also MPEP 2173.05(i).

Accordingly, Applicants respectfully submit that claims 52-54 comply with the requirements of 35 U.S.C. § 112, second paragraph.

35 U.S.C. §102(e) Rejection - Henley

The Examiner has rejected claims 31-38, 52, 40-45, 47-51 and 54 under 35 U.S.C. §102(e) as being anticipated by U.S. Patent No. 6,207,005 issued to Henley (hereinafter referred to as "Henley"). The Applicants respectfully submit that the present claims are allowable over Henley.

As amended, independent claim 55 recites a wafer processing apparatus comprising "*a plurality of metal deposition chambers, the metal deposition chambers to deposit metal layers on wafers; at least one annealing chamber, the at least one annealing chamber integrated with the wafer processing apparatus, the at least one annealing chamber to anneal the metal layers to stabilize hardness of the metal layers prior to chemical mechanical polishing; a robot to move the wafers having the metal layers deposited thereon from the metal deposition chambers directly to the at least one annealing chamber shortly after the metal layers have been deposited on the wafers*".

Henley does not teach or suggest such a wafer processing apparatus.

Henley discusses cluster tools (see e.g., Figs. 1 and 3). As discussed in Henley, the cluster tools may have various chambers "*selected from at least a CVD chamber, an etch chamber, a PVD chamber, a thermal annealing chamber, a bonding chamber, a CMP chamber, a thermal treatment chamber, a plasma treatment chamber, an epitaxial growth chamber, and others*" (see e.g., column 2, lines 41-45). The cluster tool may

include a robot to move wafers among chambers. As discussed at column 4, lines 18-20, “*robot 20 can insert and remove a wafer 16 or wafers from any one of the chambers according to a desired application*”. Henley makes it clear that the robot moves the wafers according to a desired application. However, Henley does not teach or suggest that the robot moves wafers directly from a chemical vapor deposition or other metal deposition chamber to an annealing chamber. Therefore Henley does not teach or suggest all claim limitations.

The Examiner has stated that “*since the apparatus of Henley comprises all components (CVD chamber, annealing chamber and robot) of the claim, thus the apparatus of Henley is capable to perform the functions or utilities as claimed, thus, the limitations of the claim are met*”. The Examiner has further stated “*the robot 20 is fully capable of transferring a wafer directly from one chamber to the other, prior to or shortly after a process has been completed depend upon the application*”. Applicants respectfully disagree.

Claim 55 recites a specific robot that is to move the wafers having the metal layers deposited thereon from the metal deposition chambers directly to the at least one annealing chamber shortly after the metal layers have been deposited on the wafers. The robot is not simply a mechanical device but rather has logic to cause it to perform the recited operation. In contrast, Henley does not teach or suggest that the robot is to perform this operation or that the robot has this logic. Applicants respectfully submit that it is not sufficient for the Examiner to simply assert that the robot of Henley is capable of performing the functions or utilities as claimed. This is not the standard for anticipation.

Anticipation under 35 U.S.C. Section 102 requires every element of the claimed invention be identically shown in a single prior art reference. The Federal Circuit has indicated that the standard for measuring lack of novelty by anticipation is **strict identity**.

"For a prior art reference to anticipate in terms of 35 U.S.C. Section 102, every element of the claimed invention must be identically shown in a single reference." In Re Bond, 910 F.2d 831, 15 USPQ.2d 1566 (Fed. Cir. 1990).

Accordingly, for at least one or more of these reasons, independent claim 31 and its dependent claims are believed to be allowable over Henley.

As amended, independent claim 67 recites a wafer processing apparatus comprising *"at least one annealing chamber, the at least one annealing chamber integrated with the wafer processing apparatus, the at least one annealing chamber to anneal wafers having metal layers thereon to stabilize hardness of the metal layers prior to chemical mechanical polishing; one or more chemical mechanical polishing platforms, the one or more chemical mechanical polishing platforms integrated with the wafer processing apparatus, the one or more chemical mechanical polishing platforms to polish the wafers including the metal layers; a robot to move the wafers having the metal layers deposited thereon from the at least one annealing chamber directly to the one or more chemical mechanical polishing platforms"*. Henley does not teach or suggest such a wafer processing apparatus.

Henley does not teach or suggest these limitations. In particular, Henley does not teach or suggest that the robot perform these operations or have logic to perform these operations. The discussion above is pertinent to this point.

Accordingly, for at least one or more of these reasons, independent claim 67 and its dependent claims are believed to be allowable over Henley.

As amended, independent claim 76 recites a wafer processing apparatus comprising *"one or more chemical mechanical polishing platforms, the one or more chemical mechanical polishing platforms integrated with the wafer processing apparatus"*.

the one or more chemical mechanical polishing platforms to polish wafers having metal layers thereon; at least one annealing chamber, the at least one annealing chamber integrated with the wafer processing apparatus, the at least one annealing chamber to anneal the wafers having the metal layers thereon to stabilize hardness of the metal layers after the wafers have been polished; a robot to move the wafers that have been polished from the one or more chemical mechanical polishing platforms directly to the at least one annealing chamber". Henley does not teach or suggest such a wafer processing apparatus.

Henley does not teach or suggest these limitations. In particular, Henley does not teach or suggest that the robot perform these operations or have logic to perform these operations. The discussion above is pertinent to this point.

Accordingly, for at least one or more of these reasons, independent claim 76 and its dependent claims are believed to be allowable over Henley.

35 U.S.C. §103(a) Rejection - Henley

The Examiner has rejected claims 39 and 46 under 35 U.S.C. §103(a) as being unpatentable over Henley. The Applicants respectfully submit that the present claims are allowable over Henley.

As discussed above, Henley does not teach or suggest the limitations of the independent claims. Accordingly, the independent claims are believed to be allowable over Henley. Applicants therefore elect not to address the propriety of the rejection of these dependent claims at this time.

Conclusion

In view of the foregoing, it is believed that all claims now pending patentably define the subject invention over the prior art of record and are in condition for allowance. Applicants respectfully request that the rejections be withdrawn and the claims be allowed at the earliest possible date.

Request For Telephone Interview

The Examiner is invited to call Brent E. Vecchia at (303) 740-1980 if there remains any issue with allowance of the case.

Request For An Extension Of Time

The Applicants respectfully petition for an extension of time to respond to the outstanding Office Action pursuant to 37 C.F.R. § 1.136(a) should one be necessary. Please charge our Deposit Account No. 02-2666 to cover the necessary fee under 37 C.F.R. § 1.17 for such an extension.

Charge Our Deposit Account

Please charge any shortage to our Deposit Account No. 02-2666.

Respectfully submitted,
BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP

Date: 7/10/06

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